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Abstract

PLANNING FOR NUCLEAR POWER IN THE CENTRAL ELECTRICITY GENERATING BOARD'S SYSTEM

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The United Kingdom has undertaken a large nuclear power programme, the construction of the major proportion of which is the responsibility of the C.E.G.B. Two nuclear power stations have been commissioned and are operating successfully. Six others are being built and another is planned. By 1970 it is expected that some 5,000 MW of nuclear capacity will be in service out of a total system output capacity of about 67,000 MW in England and Wales.

Integrating nuclear plant into the system presents economic, technical and social problems. Firm decisions on the capacity and location of new generating and main transmission plant have to be made five years before it is required for service taking into account the rate of demand growth, the pattern of demand, system security and the availability of suitable sites. The economics of individual projects are compared over their useful lives against a postulated background development using the present value concept.

The geographical pattern of electricity demand relative to the central coalfields has a marked effect on the location of coal-fired and nuclear power stations within the country. A new rail transport agreement has made off coalfield generation more attractive but a significant amount of bulk transmission of electrical energy to the South East at high load factor still remains economic. Major oil-fired stations are being sited in close proximity to important oil refineries.

Practical considerations such as finding technically suitable sites for nuclear power stations are equally important. Cooling water presents the major difficulty and for this reason all stations up to 1970, except one, are being sited on the coast or large estuaries. Foundation conditions must be

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able to support the heavy loads imposed by the reactor structures, sufficient land must be available to accommodate the buildings and to permit rapid construction, and good site access is essential. The choice of a site is further restricted by safety considerations. Government policy dictates that these first stations shall be sited in areas of low population density.

So far stations have been located in the load importing areas in the South and North West of the country. It is, however, possible that future stations may be sited elsewhere. Without the existence of a strongly interconnected nation-wide 275 kV transmission system, now in process of conversion to 400 kV, the introduction of nuclear power on its present scale would not have been possible.